

## ***IN THE CLAIMS***

The listing of claims will replace all prior versions and listings, of claims in the application:

### **Listing of Claims:**

Claims 1-30 (canceled)

Claim 31 (Currently Amended): A method of determining ~~an updated~~ independent control variable values for a nuclear reactor under operation, comprising:

receiving state-point data for the operating nuclear reactor, the state-point data including current values for independent control variables and for dependent performance variables of the operating nuclear reactor; and

performing an optimization process on one of a computer and computer network based on the received state-point data to generate one or more ~~optimized~~ independent control variable values.

Claim 32 (Previously Presented): The method of claim 31, further comprising:

receiving a change in at least one constraint of the nuclear reactor operation; and wherein

the performing step performs the optimization process on one of a computer and computer network based on the received state-point data and the at least one changed constraint.

Claim 33 (Previously Presented): The method of claim 32, further comprising:

executing the performing step in response to receiving state-point data that differs from previously received state-point data.

Claim 34 (Previously Presented): The method of claim 31, further comprising:

executing the performing step in response to receiving state-point data that differs from previously received state-point data.

Claim 35 (Previously Presented): The method of claim 31, further comprising:  
repeating the receiving and performing steps throughout operation of the operating nuclear reactor.

Claim 36 (Previously Presented): The method of claim 35, further comprising:  
executing the performing step in response to receiving state-point data that differs from previously received state-point data.

Claim 37 (Previously Presented): The method of claim 31, further comprising:  
displaying at least a portion of the state-point data.

Claim 38 (Previously Presented): The method of claim 37, further comprising:  
displaying at least a portion of results from the performing step.

Claim 39 (Previously Presented): The method of claim 31, further comprising:  
displaying at least a portion of results from the performing step.

Claim 40 (Previously Presented): The method of claim 31, wherein the optimization process comprises:

first simulating nuclear reactor operation for sets of independent control variable values to produce associated sets of dependent performance variable values;

generating transfer functions based on the sets of independent control variable values and the sets of dependent performance variable values, the transfer functions representing functional relationships between the independent control variables and the dependent performance variables; and

determining a set of independent control variable values for possible use in operating the operating nuclear reactor using the transfer functions.

Claim 41 (Previously Presented): The method of claim 40, wherein the first simulating step comprises:

treating the independent control variable values and the dependent performance variable values in the state-point data as a base set of independent control variable values and a base set of dependent performance variable values, respectively;

generating, from the base set of independent control variable values, modified sets of independent control variable values associated with each independent control variable in a selected group of independent control variables; and

simulating nuclear reactor operation for each of the modified sets of independent control variable values to produce modified sets of dependent performance variable values.